



Department of the Environment

Room A4.17

Romney House 43 Marsham Street London SW1P 3PY

Telex 22221

Direct Line 071 - 276 8039

Switchboard 071 - 276 3000

GTN 276

// March 1992

Dear Sir/Madam

**URBAN WASTE WATER TREATMENT DIRECTIVE
NITRATES DIRECTIVE**

I enclose a copy of a consultation paper, produced by this Department in conjunction with the Ministry of Agriculture Fisheries and Food and the Welsh Office, covering the preliminary issues raised by the need to implement these Directives.

The Urban Waste Water Treatment Directive lays down minimum standards for the provision of sewerage systems and sewage treatment. The Nitrates Directive concerns the protection of waters against pollution caused by nitrates from agricultural sources.

Both the Directives, which were adopted by the European Community in 1991, require Member States to identify particular waters as a precursor to taking action as specified in the Directives. The criteria to be used in identifying these waters are set out in general terms only in the Directives. This document states the Government's understanding of what the Directives require.

Because some of the criteria for identifying sensitive areas under the Urban Waste Water Treatment Directive are similar to or common with those to be used for identifying polluted waters under the Nitrates Directive, this initial stage of deciding how the Directives should be implemented is being undertaken as a joint exercise.

You are invited to make representations on the contents of the paper, in accordance with the procedure set out on page 16. All comments received will be taken into consideration before final decisions are made.

Yours faithfully

J. VAUGHAN

Water Quality Division

CONSULTATION PAPER ON CRITERIA AND PROCEDURES FOR
IDENTIFYING SENSITIVE AREAS AND LESS SENSITIVE AREAS
(URBAN WASTE WATER TREATMENT DIRECTIVE) AND "POLLUTED
WATERS" (NITRATES DIRECTIVE) IN ENGLAND AND WALES

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BACKGROUND

1. During 1991 the European Community agreed directives concerning urban waste water treatment and the control of nitrate pollution from agricultural sources. These are usually referred to as the Urban Waste Water Treatment Directive [UWWT Directive] and the Nitrates Directive.

2. The UWWT Directive (91/271/EEC) lays down minimum standards for the provision of sewerage systems and sewage treatment. The sewage treatment standards vary according to the nature and sensitivity of the area receiving the sewage discharge and the size of the discharge. The Directive specifies secondary treatment as the norm but provides for higher standards of treatment for discharges to sensitive areas, and at least primary treatment for discharges to less sensitive areas. Primary treatment is likely to involve a physical and/or chemical process of settlement of suspended solids. Secondary treatment generally involves biological treatment. Member States are required to identify sensitive and less sensitive areas for the purposes of this directive by the end of 1993.

3. The Nitrate Directive (91/676/EEC) concerns the protection of waters against pollution caused by nitrates from agricultural sources. It requires Member States to identify waters affected by pollution from nitrates if protective action is not taken, by mid-December 1993. The Member States must designate the areas of land draining into these polluted waters as vulnerable zones and draw up action programmes for the purpose of reducing the nitrate pollution and preventing any further such pollution. The measures to be included in the action programmes are specified in the Directive. Outside the vulnerable zones Member States must establish and promote a code of good agricultural practice.

4. This consultation document seeks views on the proposed criteria and procedures for identifying sensitive areas and less sensitive areas under the UWWT Directive and waters affected by pollution and waters which could be affected by pollution if action under Article 5 is not taken under the Nitrates Directive [to be referred to as polluted waters] in England and Wales. These proposals have been prepared by a Working Group under the chairmanship of DoE and including representatives of the National Rivers Authority, the River Purification Boards (Scotland), Welsh Office, Department of Environment (Northern Ireland), Scottish Office Environment Department, and the Ministry of Agriculture Fisheries and Food. Further consultation papers are proposed on the methodology to be used to designate vulnerable zones under the Nitrate Directive and the location and boundaries of the proposed Vulnerable Zones.

5. Separate consultation documents will be issued covering the procedures to be followed in Scotland and Northern Ireland.

SENSITIVE AREAS / POLLUTED WATERS

GENERAL

6. Some of the criteria for identifying sensitive areas under the UWWT Directive are similar to or common with those used for identifying polluted waters under the Nitrate Directive. Waters which meet these common criteria will be identified as both sensitive and polluted.

UWWT Directive

7. The criteria for identifying sensitive areas are laid down in Annex IIA of the UWWT Directive and are reproduced in Annex A of this paper. These criteria cover the following.

a. surface freshwaters intended for the abstraction of drinking water which may contain more than the concentration of nitrate laid down by the relevant provisions of the EC Directive concerning the quality required of surface water intended for the abstraction of drinking water (Directive 75/440/EEC) if protective action is not taken;

b. freshwaters, estuaries and coastal waters which are eutrophic or which in the near future may become eutrophic if protective action is not taken;

c. areas where treatment more stringent than secondary treatment is required in order to fulfil other Council Directives.

8. Eutrophication is defined as:

"the enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned."

Nitrates Directive

9. The main criteria which are to be made use of in identifying polluted waters are set out in Annex IA of the Nitrates Directive and are reproduced along with the considerations which Member States have to take into account in applying all such criteria in Annex B of this paper. The criteria in Part A of Annex I of the Directive cover the following three situations;

a. surface freshwaters, in particular those intended for the abstraction of drinking water, which contain or may contain more than the concentration of nitrates laid down by the relevant provisions of Council Directive 75/440/EEC if protective action is not taken;

b. freshwater, estuaries, coastal and marine waters which are eutrophic or which in the near future may become eutrophic if protective action is not taken;

c. groundwaters which contain more than 50mg/l nitrates (max) or which could contain more than 50 mg/l (max) if protective action is not taken.

The first two criteria are similar to those for the UWWT Directive: criteria for both directives are accordingly considered together in the following sections.

10. The Nitrates Directive defines eutrophication in a similar way to the UWWT Directive with one significant difference, the definition is restricted to eutrophication caused by compounds of nitrogen.

11. The Nitrates Directive also contains a general definition of pollution which is relevant to the identification of polluted waters. The definition is a derivative of the one contained in the Dangerous Substances Directive (76/464/EEC) and is reproduced below.

"pollution" : means the discharge , directly or indirectly, of nitrogen compounds from agricultural sources into the aquatic environment, the results of which are such as to cause hazards to human health, harm to living resources and to aquatic ecosystems, damage to amenities or interference with other legitimate uses of water;

The definition limits the scope of the directive to pollution caused by nitrogen compounds of agricultural origin, although measures under this Directive must take into account nitrogen contributions originating from "non-agricultural sources" (see Article 5.3a of the Directive), and the identification process itself has to take place taking account of the considerations set out in Annex IB of the Directive (see Annex B of this paper).

CRITERIA FOR SURFACE WATERS USED AS SOURCES OF DRINKING WATER 75/440/EEC

12. Both Directives refer to the criterion of whether surface freshwaters fail (or may fail if protective action is not taken) the requirements of Directive 75/440/EEC in relation to nitrates.

In the case of the UWWT Directive, where there is a qualifying discharge^a, such a failure leads automatically to identification as a sensitive area.

13. In the case of identifying polluted or potentially polluted waters under the Nitrates Directive it is a criterion which has to be made use of, subject to the further considerations in Annex IB of the Directive. The Nitrates Directive lays down certain monitoring requirements for the purposes of identifying polluted and potentially polluted waters. The results of the monitoring carried out under the Nitrates Directive can also be used as a simple test for identifying sensitive areas under this criterion.

14. In accordance with the requirements of the Nitrates Directive, monitoring of surface waters will start in early 1992 for a period of at least 12 months. During this period at least 20 samples will be taken at the sampling points used for the surface water intended for the abstraction of drinking water directive 75/440/EEC. Exceptionally, in circumstances where historical data show nitrate levels to be low, and in the view of the NRA the risk of exceeding the 50mg/l limit is negligible, the minimum (at least monthly) sampling frequency of the Directive will be used.

15. The results of the monitoring will be evaluated against the relevant provisions of Directive 75/440/EEC as required by the Directives. Where the surface waters contain more than the concentration of nitrates laid down in accordance with Directive 75/440/EEC, the waters must be identified as a sensitive area under the UWWT Directive, where there is a qualifying discharge, and may be identified as polluted under the Nitrates Directive.

16. For waters which could contain more than the concentration of nitrates laid down in accordance with Directive 75/440/EEC if protective action is not taken, historical data will be examined to determine any trends in the surface water concentration. Unlike groundwaters, surface waters react very quickly to the leaching of pollutants. Current information from the NRA suggests that nitrate levels in surface waters have in general remained fairly constant in recent years. The halt in the previous rising trend is due at least in part to changes in agricultural practices in recent years, for example the replacement of spring by winter cereals, and a significant reduction in autumn nitrogen fertiliser applications. Once the 1992 monitoring data is available, however, the identification of surface waters within this category will be reviewed to confirm the lack of any recent upward trend.

a. A discharge of a particular size that might require additional treatment under the terms of the Directive, depending on the nature of the receiving waters.

CRITERIA FOR ESTUARIES AND COASTAL WATERS SUBJECT TO EUTROPHICATION

17. Eutrophication of coastal and estuarine waters is normally nitrogen limited and their potential for eutrophication is therefore covered in both the Nitrates Directive and the UWWT Directive.

18. The question of eutrophication of these waters has already been addressed by both the Paris Commission [PARCOM] and the International Council for the Exploration of the Sea [ICES]. PARCOM is an international body, made up of North Western European countries which agrees measures for the protection of marine waters from the effects of discharges from land based sources. ICES is an international organisation which provides scientific advice on marine pollution. In developing criteria for the implementation of these directives the Working Group followed the PARCOM guidelines as closely as possible. These specify a range of criteria which may be symptomatic of nutrient enrichment against which any water body can be evaluated. ICES has qualified these criteria by emphasising that many of the phenomena mentioned are natural and that nutrient supply ratios are a further important factor. Whilst each symptom itself may not be indicative of undesirable eutrophication effects the scope is comprehensive and allows sound judgement taken overall.

19. Consideration of any particular sea area must be within the context of past information on nutrient inputs, their ratios and sources, local or transboundary, as well as hydrographic and meteorological data. For example, nutrient loads from shore, currents, light conditions, temperature, wind.

Recommendation

20. The assessment of whether a stretch of water actually or potentially is eutrophic is not possible simply by reference to numeric chemical criteria. However a number of symptoms should be considered in order to come to a judgement as to whether an individual stretch of water is suffering or likely to suffer from eutrophication. The importance of particular symptoms will depend on local circumstances. The Working Group has recommended that the regulatory authorities should consider the following symptoms when identifying estuarine, coastal and marine waters as eutrophic or potentially eutrophic sensitive areas/polluted waters;

a. Nitrate Concentrations

Winter (February) nitrate-nitrogen concentrations significantly enhanced relative to a background concentration for a defined geographical area based on salinity.

b. Occurrence of exceptional algal blooms:

Attention should be given to the occurrence of unusual blooms of phytoplanktonic species or of blooms of unusual scale or blooms with unusual toxicity characteristics.

In considering abundance it can be taken that blooms of algae in coastal waters normally reach densities of at least 5×10^5 cells per litre and chlorophyll-a concentrations of around 10 mg/m^3 .

c. Duration of Algal Blooms

It could be considered exceptional if the normal spring bloom algal densities persisted through the summer until the autumn bloom without the typical nutrient-limited decline in the summer.

d. Oxygen Deficiency

Attention should be given to decreased oxygen concentration at the surface, as well as in deeper water layers, including in areas where sedimentation and/or stratification may occur.

Care must be taken under this heading to ensure that consideration is given to oxygen deficiency which is due to the decay of plant material and not caused by organic discharges to the local areas.

e. Reductions in Fauna

Substantial increases or decreases in benthic biomass, shifts in species composition and mortality of benthos and fish.

f. Changes in Macrophyte Growth

These can be relatively minor, such as the disappearance of red algal species, or a reduction in depth of the photic zone, or more significant, for example dense and widespread growth of Enteromorpha spp.

g. Occurrence and Magnitude of Paralytic Shellfish Poisoning (PSP)

The occurrence of PSP-causing species (eg Alexandrium sp) is endemic in areas around the UK coast even where there is no nutrient enrichment and blooms of varying significance occur each year. However, their scale may be enhanced by nutrient enrichment, extending the duration and geographic area of effect of the present chronic phenomenon. Such an extension could indicate eutrophication but could also be due to a variety of natural causes.

h. Formation of Algal Scums on Beaches and Offshore

Dense blooms of colonial or chain-forming species (e.g. *Phaeocystis*, *Chaetoceros*) can result in drifts of cells on the sea surface or on the strand-line, or slimy deposits on fish nets or drogues. The significance of these phenomena should be placed in a historical perspective as such phenomena have been regularly recorded in some UK coastal waters for over 100 years.

CRITERIA FOR FRESHWATERS SUBJECT TO EUTROPHICATION

21. Studies of freshwaters have shown that eutrophication is controlled by a number of factors. These include nutrients, flow rate of waters, shading and turbidity, depth, temperature and turbulence. The relationship of many of these factors to eutrophication is not easily quantified.

22. One factor which is an essential precursor to eutrophication is the presence of nutrients in sufficient quantity to support sustained algal and macrophyte growth. The nutrient which controls the production in most freshwaters is phosphorus and it is known as the limiting nutrient. Rooted plants obtain most, or all, of their phosphorus from sediments via the root system, whereas nitrogen may be obtained directly from the water. However, nitrogen in rivers is unlikely to be a limiting factor for macrophyte growth.

23. Depending on the other factors, accelerated growth of algae and macrophytes may take place. The results of the accelerated growth and increase in biomass could give rise to some measurable effects in the waterbody concerned. These effects include marked diurnal fluctuations in dissolved oxygen concentrations and pH value, increased overnight carbon dioxide concentrations, increases in discolouration and turbidity, and enrichment of sediments with organic matter.

24. It can be seen that there are a number of parameters which, taken in turn, can be used to examine the status of freshwaters to assess whether eutrophication is occurring, or likely to occur.

Still Freshwaters

25. The OECD carried out a review of eutrophication problems in standing freshwaters. The results of this review were published in "Eutrophication of Waters: Monitoring, Assessment, and Control", (OECD, Paris, 1982).

26. This report concluded that the eutrophication process could be described using a number of parameters, the most useful of which were:-

- (a) Total phosphorus concentration.
- (b) Chlorophyll a concentration.
- (c) Secchi disc depth. (A measure of light penetration).

The report considered that a water has a greater than 50% probability of being eutrophic where the annual average (geometric mean) total phosphorus concentration is greater than 50µg/l. The corresponding figure for annual average chlorophyll a concentration is 9 µg/l, for peak chlorophyll a concentration 30 µg/l, and for Secchi disc transparency 3 m. (All geometric means).

27. Total phosphorus measures the "pool size" of phosphorus and is also generally the best estimator of bioavailable phosphorus. Furthermore the use of total phosphorus concentrations in still waters is necessary for conformity with the OECD model database. This determinand will be adopted for assessment of the trophic status of lakes.

28. A number of symptoms are also useful in characterising the eutrophic state of freshwaters, for example increase in colour, changes in abundance and diversity of biota, the formation of exceptional scums and blooms, production of algal toxins, and fish kills due to toxins or low dissolved oxygen.

Running Freshwaters

29. The identification of parameters for the assessment of eutrophication in rivers and streams is complex. Most effort has been directed at determining phosphorus concentrations below which nuisance growths will not occur. Total phosphorus concentrations of 30µg/l (monthly mean)^a, 30µg/l (annual mean)^b and 100µg⁻¹ (maximum concentrations)^c have all been proposed as levels which would prevent any plant 'nuisance' arising. Significant plant growth related problems in British rivers have been associated with orthophosphate (PO₄-P) concentrations in excess of 100µg/l PO₄^d. There are examples of severe effects at levels in excess of 1000µg/l PO₄^{d,e,f}.

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- a. Clyde River Purification Board (1989). "Eutrophication in flowing waters." Technical Report No 92, Technical Report No 92, Clyde RPB, Rivers House, East Kilbride.
 - b. Cartwright N.G and Painter H. (1991). "An Assessment of the environment quality standards for inorganic nutrients necessary to prevent eutrophication". Draft Report No.2397, WRC plc, Medmenham, Buckinghamshire.
 - c. Mackenthun, K.M (1973). "Towards a cleaner aquatic environment". U.S Environmental Protection Agency, Washington D.C.
 - d. Pitcairn C.E.R and Hawkes H.A (1973). "The role of phosphorus in the growth of Cladophora". Water Research 7pp 159-171.
 - e. Fouracre V.A. and Price P.C. (1985). "Factors affecting the growth of Cladophora in Rivers". Final Report to the Department of the Environment in respect of Contract No PECD7/7086-159/82 November 1985.
 - f. Forth River Purification Board (1990) "River Almond Modelling Group progress report to March 1990". Forth RPB Report No. FC08/89.

30. The diversity of measurements and proposals illustrates the difficulty of quantifying nutrient enrichment liable to cause adverse effects in flowing waters. Not only are effects mediated by physical factors and innate variability in concentration but algae also have the ability to assimilate and store excess phosphorus further complicating evaluation of causal relationships.

31. The historical database in UK on phosphorus concentrations in rivers is based on orthophosphate analyses (PO_4P). Furthermore this form is more relevant than "pool" phosphorus in the transient conditions of rivers. For these reasons the assessment of running waters in the United Kingdom will be based upon measurements of orthophosphate in conjunction with the other factors described. An indicative orthophosphate level of $100\mu\text{g/l}$ as an annual average concentration is proposed.

32. In rivers affected by planktonic algae, chlorophyll a concentrations maybe measured as for standing waters. There is no good database to indicate concentrations at which chlorophyll a levels in rivers may be assumed to indicate eutrophic conditions.

33. The measurement of chlorophyll a concentrations in the water column will not be appropriate for those nutrient enriched rivers where attached algae, particularly Cladophora, are the main problem. The quantification of attached algal biomass in rivers is possible but the techniques are difficult and costly. Estimates of the percentage cover of algae could provide a useful estimate of biomass.

34. Daytime DO levels above 150% saturation are an indication of excess growth occurring and hence of the possibility of eutrophication. Excessive growth of planktonic or attached algae, or rooted macrophytes will usually give rise to exaggerated diurnal dissolved oxygen cycles in rivers. Photosynthesis during daylight may produce dissolved oxygen saturations above 150%, whilst respiration may reduce nighttime saturations to near zero. This can be the easiest and most reliable measure of eutrophication in flowing waters.

35. All three parameters can be used to indicate whether a river is eutrophic or potentially eutrophic, thus:-

(a) phosphate concentrations will indicate which rivers are susceptible to severe eutrophication

(b) biomass of attached algae and macrophytes will indicate the extent of growth, chlorophyll a concentrations will indicate the extent of planktonic algal growth, where relevant

(c) dissolved oxygen diurnal cycles will integrate the combined effects of all algae and macrophytes and describe the severity of eutrophication.

In rivers having a true phytoplankton responsible for producing the adverse effects of eutrophication, a consideration of reproduction rates and retention time within the river system may be important.

36. Even when all these conditions have been satisfied final decisions on the designation of sensitive areas can only be taken by examining local conditions.

Recommendation

37. As with the criteria for assessing eutrophication in estuaries and coastal waters, the assessment of whether a stretch of freshwater is eutrophic is not possible simply by means of setting numeric chemical criteria. However a number of symptoms should be considered in order to come to a judgement as to whether an individual stretch of water is suffering or likely to suffer from eutrophication. The importance of particular symptoms will depend on local circumstances. The Working Group has recommended that the regulatory authorities should consider the following symptoms when identifying freshwater as eutrophic or potentially eutrophic sensitive areas;

Still Freshwaters

38. The following symptoms all need to be considered when identifying still freshwaters as eutrophic or potentially eutrophic but the presence of any of them, either singly or in combination, will not necessarily indicate eutrophication and a final judgement will depend on local conditions and knowledge.

(a) *Phosphorus concentrations*

An annual average (geometric mean) total phosphorus concentration of greater than 50 $\mu\text{g/l}$.

(b) *Chlorophyll a concentrations*

Peak chlorophyll a concentrations of greater than 30 $\mu\text{g/l}$.

(c) *Water clarity*

An annual average (geometric mean) Secchi disc transparency of less than 3 m, due to algal biomass (water colour predominantly green).

(d) *Dissolved oxygen*

Excessive supersaturation of surface layers and decreased saturation in deeper stratified layers (hypolimnion)

(e) *Effects on fauna*

Reduction in diversity and abundance of invertebrates and fish fauna which can be attributed to the effects of nutrient enrichment.

(f) *Effects on macroflora*

Substantial adverse changes in macrophyte abundance and diversity.

(g) *Effects on microflora*

Exceptional increases in plankton, floating or attached algal biomass leading to blooms, scums, or discolouration

Running Freshwaters

39. The following symptoms all need to be considered when identifying running freshwaters as eutrophic or potentially eutrophic but the presence of any of them, either singly or in combination, will not necessarily indicate eutrophication and a final judgement will depend on local conditions and knowledge.

(a) *Phosphorus Concentration*

An annual average orthophosphate concentration over 100 µg/l with peak values well in excess of this concentration.

(b) *Algal Biomass*

Excessive growth of attached algae, especially *Cladophora*, which may reach biomass levels of several hundred g/m². Planktonic algae producing annual mean concentrations of more than 25 µg/l chlorophyll a or a maximum of 100µg/l.

(c) *Water Retention Time*

In rivers affected by planktonic algae, sufficient retention time for algal multiplication (normally over 5 days).

(d) *Dissolved Oxygen*

A strong diurnal cycle of dissolved oxygen saturation, daytime supersaturation levels (over 150%) and reduced nighttime saturation levels.

(e) *Effects on Fauna*

Reductions in diversity and abundance of invertebrates and fish fauna which can be attributed to the effect of nutrient enrichment.

(f) *Effects on Macroflora*

Substantial adverse changes in macrophyte abundance and diversity.

(g) *Effects on Microflora*

Exceptional increases in planktonic, floating, or attached algal biomass leading to blooms, scums or discolouration.

CRITERIA FOR GROUNDWATERS - NITRATES DIRECTIVE***Background***

40. The requirement to identify groundwaters which are affected by pollution or could be affected by pollution relates only to the Nitrates Directive. The NRA will set out monitoring requirements for groundwaters at sampling stations representative of the aquifers. These may be sampled and analysed by the relevant Water Company and the data included in the assessment if the NRA is satisfied with the sampling and analytical procedures.

41. A step by step procedure has been devised for identifying groundwaters which should be considered as polluted waters. The rationale behind this procedure is explained in Annex C. The procedure involves the following six steps.

a. Identify all groundwater sources with levels in excess of 50mg/l or a positive linear nitrate trend. In many cases the exercise can be done reliably by inspection of data on a graph. For more variable data, typically from fissured rock, statistical smoothing of the data will be needed before the trend can be interpreted. Ideally, five to ten years data is necessary to make a reliable judgement.

b. Reject all those sources which, by linear extrapolation, are not projected to have a nitrate concentration in excess of 50 mg/l by 2010. This date has been chosen on the basis that a 20-year extrapolation is the most that can be done with any credibility, recognising that there will be ample time to review.

c. Reject all those sources where factors other than agricultural land use play a determining role, eg sources influenced primarily by urban areas.

d. For the remaining sources identify the size and general dimensions of the catchment area. From available records of land use and research data on nitrate leaching estimate the equilibrium nitrate leaching from the current

land use. By relating this to effective rainfall an estimate of the likely equilibrium nitrate concentration in the aquifer can be made.

e. Those sources where the expected equilibrium nitrate concentration is 45 mg/l nitrate or less can be rejected.

f. The remainder are candidates for consideration as polluted waters and it will be necessary to repeat step (d) with more precise catchment boundaries and with more reliable land use data in order to refine the list.

Approach being adopted

42. Steps 41 (a) and (b) will be carried out by the NRA who will initially identify the area (but not, at this stage, the shape) of the catchments in question and also the effective rainfall for the areas (needed for leaching calculations). More reliable catchment areas will subsequently be prepared by the NRA.

43. Discussions are currently taking place in the framework of the CAP as to the future shape and funding of agriculture in Europe. The effects of any changes agreed in that forum on the predicted nitrate levels in groundwaters will need to be taken into account when reviewing the identification of polluted groundwaters.

CRITERIA IN RELATION TO IMPLEMENTATION OF OTHER DIRECTIVES - UWWT DIRECTIVE

44. The last criterion in the UWWT Directive for the identification of sensitive areas relates to areas where treatment more stringent than the secondary treatment in the UWWT Directive is required in order to fulfil [other] Council Directives. There may be some circumstances where it will prove necessary to identify a sensitive area in order to fulfil the requirements of other directives such as the Freshwater Fish Directive 78/659/EEC or the Shellfish Waters Directive 79/923/EEC. The NRA has been asked to identify occurrence of such circumstances.

LESS SENSITIVE AREAS - UWWT DIRECTIVE

Directive's Requirements

45. The UWWT Directive allows Member States to apply less stringent treatment [at least primary] to discharges to less sensitive areas. This provision only applies to the following ;

a. discharges of 2,000 to 10,000 population equivalents [pe]^a to estuaries

b. discharges of 10,000 to 150,000 pe to coastal waters

46. The criteria for identifying less sensitive areas are set out in Annex IIB of the Directive and are reproduced in Annex A of this paper along with the considerations which Member States have to take into account in applying the criteria.

The criteria cover the following:

a. the discharge does not adversely affect the environment due to morphology, hydrology, or specific hydraulic conditions;

b. the risk of detrimental effects in adjacent areas, particularly sensitive areas;

and the following elements should be taken into consideration:

Good water exchange, no eutrophication [or potential] and no oxygen depletion.

47. For discharges to less sensitive areas the Directive requires;

a. the application of at least primary treatment;

b. comprehensive studies to indicate that discharge will not adversely affect environment;

c. monitoring and studies to verify the discharge is not adversely affecting the environment.

General Criteria

48. It is proposed that less sensitive areas will be identified where all the following circumstances obtain in estuaries:

a. there is a discharge of between 2,000 and 10,000 pe or plans for such a discharge

^a. 1 pe (population equivalent) means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60g of oxygen per day.

- b. there is an absence of eutrophication problems in the case of an existing discharge or a predicted absence subsequent to the commencement of the discharge in the case of a new discharge
- c. dissolved oxygen concentrations in the estuary are not significantly affected by the sewage discharge
- d. the discharge does not, or is unlikely to, adversely affect the environment
- e. there are no or unlikely to be significant detrimental effects attributable to the discharge in adjacent areas including areas in other Member States.

It is proposed that less sensitive areas will be identified where all the following circumstances obtain in coastal waters:

- f. there is a discharge of between 10,000 and 150,000 pe or plans for such a discharge
- g. there is an absence of eutrophication problems in the case of existing discharges or a predicted absence subsequent to the commencement of the discharge in the case of new discharges
- h. within one nautical mile of the discharge the sewage will have been diluted two hundred times. (based on achieving post dilution a BOD of $< 1\text{mg/l}$);
- i. the discharge does not or is unlikely to adversely affect the environment
- j. there are no or unlikely to be significant detrimental effects attributable to the discharge in adjacent areas including areas in other Member States.

CONSULTATION PERIOD

49. The Government would welcome comments on the proposals for identifying sensitive areas, less sensitive areas and polluted waters by 16 April 1992. Any such comments should be sent to Mrs S J French, the Department of the Environment, Water Quality Division, Room A4.17, Romney House, 43 Marsham Street, London SW1P 3PY, (Telephone: 071-276-8039). Comments from Welsh organisations should be copied to Miss E Read, Welsh Office, Environment Division, New Crown Building, Cathays Park, Cardiff, CF1 3NQ, (Telephone: 0222 82 3192).

CRITERIA FOR IDENTIFICATION OF SENSITIVE AND
LESS SENSITIVE AREAS

A. Sensitive areas

A water body must be identified as a sensitive area if it falls into one of the following groups :

- (a) natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken.

The following elements might be taken into account when considering which nutrient should be reduced by further treatment :

- (i) Lakes and streams reaching lakes/reservoirs/closed bays which are found to have a poor water exchange, whereby accumulation may take place. In these areas, the removal of phosphorus should be included unless it can be demonstrated that the removal will have no effect on the level of eutrophication. Where discharges from large agglomerations are made, the removal of nitrogen may also be considered.
- (ii) Estuaries, bays and other coastal waters which are found to have a poor water exchange, or which receive large quantities of nutrients. Discharges from small agglomerations are usually of minor importance in those areas, but for large agglomerations, the removal of phosphorus and/or nitrogen should be included unless it can be demonstrated that the removal will have no effect on the level of eutrophication.
- (b) Surface freshwaters intended for the abstraction of drinking water which could contain more than the concentration of nitrate laid down under the relevant provisions of Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in the Member States ⁽¹⁾ if action is not taken.
- (c) Areas where further treatment than that prescribed in Article 4 of this Directive is necessary to fulfil Council Directives.

B. Less sensitive areas

A marine water body or area can be identified as a less sensitive area if the discharge of waste water does not adversely affect the environment as a result of morphology, hydrology or specific hydraulic conditions which exist in that area.

When identifying less sensitive areas, Member States shall take into account the risk that the discharged load may be transferred to adjacent areas where it can cause detrimental environmental effects. Member States shall recognize the presence of sensitive areas outside their national jurisdiction.

The following elements shall be taken into consideration when identifying less sensitive areas :

Open bays, estuaries and other coastal waters with a good water exchange and not subject to eutrophication or oxygen depletion or which are considered unlikely to become eutrophic or to develop oxygen depletion due to the discharge of urban waste water.

CRITERIA FOR IDENTIFYING WATERS
REFERRED TO IN ARTICLE 3(1)

A. Waters referred to in Article 3(1) shall be identified making use, inter alia, of the following criteria:

- (1) whether surface freshwaters, in particular those used or intended for the abstraction of drinking water, contain or could contain, if action under Article 5 is not taken, more than the concentration of nitrates laid down in accordance with Directive 75/440/EEC;
- (2) whether groundwaters contain more than 50 mg/l nitrates or could contain more than 50 mg/l nitrates if action under Article 5 is not taken;
- (3) whether natural freshwater lakes, other freshwater bodies, estuaries, coastal waters and marine waters are found to be eutrophic or in the near future may become eutrophic if action under Article 5 is not taken.

B. In applying these criteria, Member States shall also take account of:

- (1) the physical and environmental characteristics of the waters and land;
 - (2) the current understanding of the behaviour of nitrogen compounds in the environment (water and soil);
 - (3) the current understanding of the impact of the action taken under Article 5.
-

PREDICTING TRENDS IN LEVELS OF NITRATES IN GROUNDWATER

1. Nitrate concentrations in groundwater sources affected principally by changes in land practices vary with time, in a theoretical and generalised way, in an S-shaped trace (see Figure 1). The lower limb of the S relates to the nitrate level prior to the impact of the change of land activity which increases nitrate leaching. There is a rising limb of the S which starts when there is a "breakthrough" of additional surface-derived nitrate pollutants and then an upper limb where concentrations fully reflect the change in land use if land practices remain stable. The time span for this process could be up to 40 years or more.

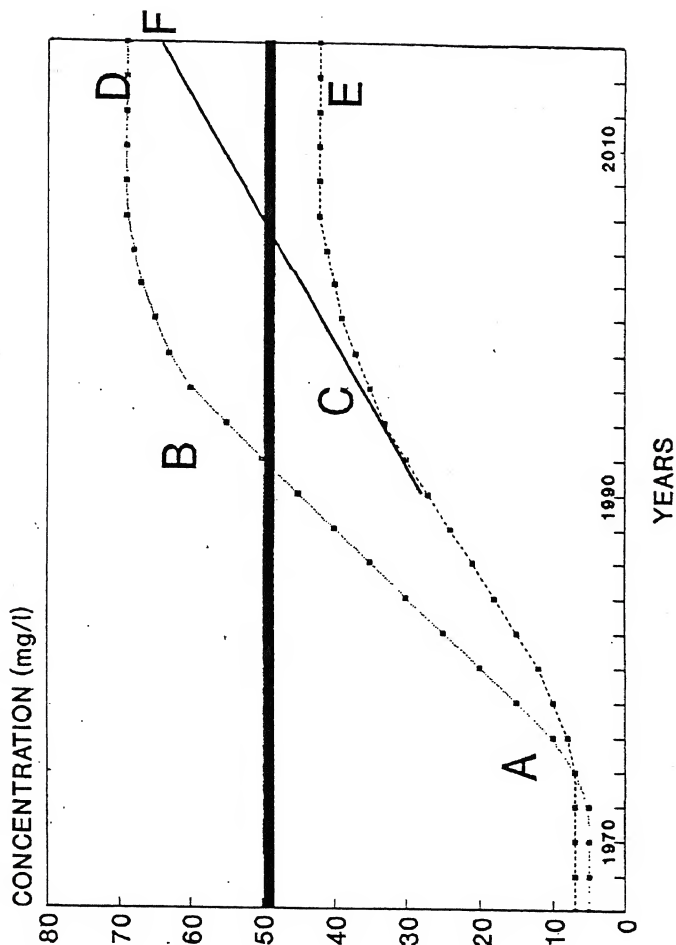
2. The slope of the rising limb is controlled by geology and hydrology. That is, there will be a faster rise rate in low porosity, high permeability aquifers with shallow water tables than in high porosity, lower permeability aquifers with deeper water tables.

3. The final concentration is determined by rainfall, abstraction patterns, and the final stable land use. If land use changes have led to reductions in nitrate leaching, the upper limit of the S will slope downwards, and a stable level of nitrate in the aquifer will not be reached until the lower concentration leachate has diluted the aquifer to its own concentration. If land use is always changing an equilibrium may never be reached. In meeting target standards for groundwater quality in such sources it is the land use which is the determining factor. Hydrogeological factors only influence how long the process will take.

4. This model is relevant to the identification of groundwaters which may be in excess of 50 mg/l at a future date unless changes are made to land use practices. Both of the sources depicted in the diagram have a rising trend and from a decision made now it is not possible to judge with confidence whether either or both will eventually exceed the limit. However, the equilibrium nitrate concentration can be estimated by analysis of the land use in the catchment to the source and a calculation of the likely nitrate leaching based on research data. Such an exercise would show that source AC, although rising steeply now would not be expected to continue rising to point F but reach an equilibrium level E less than 50 mg/l. Conversely source AB, although the nitrate concentration would not be expected to climb at the same rate for ever, would reach equilibrium at a nitrate level in excess of 50 mg/l. This approach, although limited in accuracy by both scientific understanding and detail of land use data, is the best available given current knowledge.

FIGURE 1

PREDICTION OF NITRATE TRENDS IN GROUNDWATER SOURCES



ENVIRONMENTAL ASPECTS OF SUPPORT FOR HILL FARMING

CONSULTATION DOCUMENT

Introduction

1. In the Environment White Paper 'This Common Inheritance', published on 25 September 1990, the Government announced that it would examine whether the existing environmental benefits afforded by Hill Livestock Compensatory Allowances (HLCAs) should be made more specific; and undertook to consult fully before reaching conclusions. This document, issued jointly by the four United Kingdom Agriculture Departments, sets out the Government's proposals and forms the basis for these consultations.

2. HLCAs are paid within the less favoured areas of the United Kingdom (LFA) under Council Regulation 2328/91 to assist farming activities, the allowance being fixed according to the permanent natural handicaps affecting farming activities in those areas. Their objectives are to ensure the continuation of livestock farming, thereby helping to maintain a viable population in the areas and to conserve the countryside. Member States may also lay down additional conditions, including conditions which encourage the use of practices compatible with the need to safeguard the environment and preserve the countryside, and adjust allowances accordingly.

3. HLCAs have undoubtedly been successful in maintaining livestock farming in the LFA. This in turn has helped to sustain the variety of landscapes characteristic of the hills and uplands. These landscapes are highly valued in themselves; and they also contribute to the rural economy through, inter alia, the stimulation of tourism. Nevertheless, over a period of years increased stocking of grazing land by sheep in some parts of the severely disadvantaged areas, encouraged to an

extent by the availability of HLCAs, has been seen to have contributed to the decline of valuable and sensitive habitats in certain upland regions. Among the most important of these habitats, and one characteristic of much of the uplands throughout the UK, is heather moorland. The existing provisions of the Hill Livestock (Compensatory Allowances) Regulations designed to discourage overgrazing have proved insufficiently effective. There is, in addition, concern at the condition in some areas of various features of the upland landscape, including hedges and stone walls used to define field boundaries.

4. It is recognised that it would be impossible and undesirable to seek to return the LFA countryside to its condition at some time in the past. Indeed, the structure of the HLCA scheme and the EC legislation on which it is based are not capable alone of achieving such radical change. But the environmental changes noted above must be addressed.

Objectives for the LFA

5. The Government believes that the main objectives of increasing the environmental benefits of HLCAs and associated measures should be achieved alongside the existing ones of ensuring the continuation of livestock farming in the hills and uplands and the need to offer value for money. These objectives should be:

(a) to reduce the incentive to graze stock at levels which diminish the quality of semi-natural vegetation;

(b) to ensure that provisions restricting HLCA payments where overgrazing occurs can be, and are, enforced;

(c) to encourage good moorland management and the regeneration of heather, particularly where semi-natural habitat is under threat;

(d) to provide guidelines to farmers on the maintenance of the distinctive character of hill and upland areas.

The Proposals

6. After careful study the Government believes that the most cost-effective methods of securing these objectives would be:-

(a) by scaling HLCA payments to shift the balance in favour of those who stock at lower densities. A differential would gradually be introduced for sheep in the Severely Disadvantaged Areas (SDA) between the HLCA rate paid on the first, say, 1.5 ewes per hectare and that paid on subsequent ewes per hectare;

(b) through the introduction of further Environmentally Sensitive Areas aimed at encouraging the regeneration of damaged heather and other upland vegetation. The Government's statutory advisers have been consulted on the most appropriate location and size of areas for designation;

(c) by introducing a specific definition of overgrazing into the HLCA Regulations so that farmers have a clear statement of what is required of them, and that effective enforcement action can be taken where required;

(d) by the promulgation of a Code of Good Upland Management, which would provide guidelines to farmers on means of farming effectively whilst conserving the distinctive semi-natural flora, and other landscape and wildlife features, of the hills and uplands; and

(e) by ending, in cases where overgrazing is occurring, the present administrative practice whereby unused common land grazing rights are reallocated on a notional basis

among HLCA applicants whose claims are affected by the headage or area payment limitations.

These five specific amendments would be supplemented by continuing pressure in European Community negotiations for powers to amend other livestock support mechanisms which bear upon individual farmers' decisions on stocking rates in the hills and uplands.

The Background to the Proposals

A. Dealing with overgrazing

7. A wide range of options to deal with overgrazing has been considered. If nothing were to be done, semi-natural vegetation in parts of the hills and uplands would continue to decline.

i) Changing the Regulations

8. The HLCA scheme at present imposes payment limits for sheep of 6 ewes per hectare in the Severely Disadvantaged Areas and 9 ewes per hectare in the Disadvantaged Areas (DA). Consideration was given to imposing a lower limit, perhaps restricted to moorland. But each area of moorland has its own optimum stocking density, and a uniform (or even regional) stocking limit for moorland would still result in some areas being overgrazed, and others being undergrazed. Furthermore the optimum stocking density depends partly on the management of the flock; for example most farmers move stock around their holding during the year to take advantage of seasonal grazing. It would not be realistic for Government to set and police optimal grazing limits for each area of moorland and each season of the year as part of the HLCA Scheme. These practical difficulties cannot be ignored.

9. Instead consideration was given to tackling the problem of overgrazing on two fronts; directly by strengthening the existing overgrazing provision in the HLCA Regulations, and by specific measures appropriate to specific localities; and indirectly by altering the payment structure to reduce the incentive to increase stocking levels.

10. The HLCA Regulations provide that the number of ewes on which HLCA may be paid shall be that number "which the appropriate Minister determines to be the number which the land on which the flock was substantially grazed was, in his opinion, capable of carrying without overgrazing, taking into account the number of other animals grazed ... on the land." Similar provisions are made for breeding cows. "Overgrazing" is not defined and the provision has proved difficult to operate. It is accordingly proposed that the Regulations be amended so as to define overgrazing. A working definition would be to define overgrazing as occurring where stock numbers adversely affect the growth of vegetation to a significant degree. It is expected that this will greatly facilitate the Agriculture Departments' efforts to tackle overgrazing on a case by case basis and enable resources to be better focused. The definition is consistent with sound management of grazing land and is applicable regardless of the quality of the grazing. Consistency of enforcement would be assisted by the issue of detailed guidance.

(ii) Altering the Structure of HLCA Rates

11. At present HLCAs are paid at a single rate for each category of animal, regardless of the number of animals per hectare, subject to the Scheme maxima. The marginal rate of payment for each additional animal is thus a constant (up to the maximum permitted) regardless of stocking density. Thus there is no signal given to producers that lower stocking rates may be desirable.

12. It is therefore proposed that HLCA rates for ewes in the SDA should be scaled in order to diminish the incentive towards heavy stocking rates. This proposal could be achieved by amending the HLCA Regulations so as to allow for a differential between the rate paid for the first 1.5 ewes/hectare and that paid on subsequent ewes. The differential would be introduced gradually as rates are adjusted in the future. The adjustment could for example be made by combining an increase for the first 1.5 ewes/hectare with a reduction for subsequent ewes. Decisions on the actual rates to be paid - taking account of all the relevant economic and other evidence - would continue to be taken in the course of the periodic Reviews of Economic Conditions in the Hills and Uplands.

(iii) Apportionment Of "Unused" Common Land Grazing Rights

13. The grazing area available to many HLCA claimants consists in part of common land. In order to implement the various stocking and area payment limits that apply under the scheme the area of the common is normally divided amongst those farmers with grazing rights pro rata to the number of stock they are entitled to graze. This then provides a notional area on which to base the area and headage payment limits.

14. Where however a share of common land grazing is held by a non-claimant or a claimant who does not stock to the HLCA payment ceilings then under present administrative rules the area of "unused" land can be reallocated. This reallocation is made on a notional basis to other claimants, again on a pro rata basis, so that they can increase the area of their holding for the purposes of the Scheme and thereby benefit from greater HLCA receipts.

15. This approach has been criticised on the grounds that it may encourage common land to be overgrazed. The Government accepts that, although the impact of this rule is fairly limited, it may have an unhelpful effect. It is therefore

proposed that on commons where overgrazing is found to occur, the practice of reallocating "unused" land to other claimants will be discontinued.

(iv) ESA Designation

16. The Government proposes to designate as ESAs certain hill and upland areas where the semi-natural vegetation is under particular threat. It has asked its statutory advisers for a considered assessment of the role that ESAs could perform in the areas which would be most suitable for designation.

(v) Extensification

17. Last year the Government introduced pilot extensification schemes for beef and sheep. The schemes are designed to reduce beef sales or the size of the breeding flock on participating farms. The schemes apply both in the LFA and non-LFA and include environmental conditions. In the light of experience gained with the pilot schemes the future arrangements for extensification are under consideration. These will need to take account of EC developments, in particular the possibilities presented by the EC Commission's recent proposal for a new scheme which includes provisions aimed at reducing stock numbers where damage is being caused by overstocking of sheep and cattle.

B. Conserving Other Environmental Features - Code of Good Upland Management

18. The Government is conscious of the need to conserve the characteristic landscape and wildlife features of our hill and upland areas. In those areas selected for designation as ESAs measures will also be taken to conserve such features, in addition to securing the regeneration of heather.

19. It is also proposed that a Code of Good Upland Management be promulgated to give guidance to farmers on the maintenance of distinctive semi-natural upland flora, and other landscape and wildlife features of the hills and uplands. The Ministry of Agriculture, Fisheries and Food's Agricultural Development and Advisory Service, the Scottish Agricultural Colleges and the Department of Agriculture for Northern Ireland Farm and Countryside Service are able to advise farmers on techniques appropriate to their individual circumstances. A draft Code is appended to this document.

20. The issue of clear guidance and encouragement should help all farmers to work towards the standards of the best in maintaining landscape and wildlife features on their holdings. The Government will keep the position under review in the light of existing Regulations and EC developments, reserving the right to make compliance with some or all elements of the Code a condition of payment of HLCAs should this prove necessary in order to safeguard the environment.

C. The European Dimension

21. HLCAs are the only form of support available to hill and upland livestock producers for which powers to introduce environmental provisions are currently available. The Government will continue to encourage the Community to integrate environmental considerations more closely into other agriculture policies including those having an impact in the hills and uplands.

Conclusion

22. Views are sought on the Government's proposals for reform of HLCAs and associated measures described above. Comments, addressed to one of the following addressees, should be received by 31 December 1991.

Addresses for comment:

- Mr S Preston
Ministry of Agriculture, Fisheries and Food
Room 611
Whitehall Place (West Block)
London, SW1A 2HH
- Mr I McWilliam
Scottish Office Agriculture and Fisheries Department
Room 260
Pentland House
Robbs Loan
Edinburgh EH14 1TW
- Mr D J Getty
Department of Agriculture for Northern Ireland
Room 560
Dundonald House
Upper Newtownards Road
Belfast BT4 3SB
- Mr J Carter
Welsh Office Agriculture Department 1
Welsh Office
Cathays Park
Cardiff, CF1 3NQ

Ministry of Agriculture, Fisheries and Food
Scottish Office Agriculture and Fisheries Department
Department of Agriculture for Northern Ireland
Welsh Office Agriculture Department

GLOSSARY

Common land - means land subject to rights of common and waste land of a manor not subject to rights of common, but does not include a town or village green or any land which forms part of a highway.

Disadvantaged (DA) or Severely Disadvantaged Areas (SDA) - comprise land inherently suitable for extensive livestock production, but unsuitable for growing crops materially in excess of those necessary to feed the livestock; and the range of agricultural production is restricted or severely restricted by soil, relief, aspect or climate.

Ewe - a female sheep greater than one year old.

Heather - all species of ericaceous dwarf-shrub and the semi-natural heathland communities in which they occur.

HLCA - Hill Livestock Compensatory Allowances are paid under the authority of the Hill Livestock (Compensatory Allowances) Regulations 1984, as amended and, in Northern Ireland, under the Hill Livestock (Compensatory Allowances) Regulations (Northern Ireland) 1987 as amended. These regulations implement part of Council Directive 75/268/EEC on mountain and hill farming in certain less favoured areas, and part of Council Regulation 2328/91 on improving efficiency of agricultural structures.

HLCA payment limits - HLCAs are not paid on those sheep grazed in excess of 6 ewes per hectare in the SDA and 9 ewes per hectare in the DA. A payment limit for all eligible livestock of £62.48 per hectare of SDA land and £46.86 per hectare of DA land also applies. Throughout the LFA payments are limited to 1.4 livestock units per forage hectare.

Less-favoured area (LFA) - Designated by the EC Council of Ministers. Comprises the DA and SDA and is the area in which the HLCA Scheme applies. Defined as area shaded pink (SDA) or blue (DA) on statutory maps.

Livestock unit - For the purposes of the HLCA Scheme, one livestock unit is equivalent to one cow or 6.67 ewes.

Overgrazing - Overgrazing occurs where stock numbers affect the growth of vegetation to a significant degree.

Semi-natural habitat - habitat which, though modified by human activity, supports communities of native plants and animals which are similar in structure to natural communities.

Stocking rate/Stocking density - numbers of ewes or livestock unit equivalent per hectare.

CODE OF GOOD UPLAND MANAGEMENT

The hills and uplands of the United Kingdom are a major environmental and agricultural asset. Their characteristic landscape and wildlife features need to be conserved, and the people who farm the land have the key role to play. This Code therefore sets out some guidelines for upland farmers on how to help maintain the character of the countryside where they live and work. The Code sets out the minimum standards that should be observed but it is hoped that many farmers will wish to take further steps to enhance their environment. Advice based on farmers' individual circumstances is available from their local office of the UK Agriculture Departments and Conservation Agencies.

WHOLE FARM AREA: Points 1 to 6 of the Code apply to all the open moorland, enclosed rough grazing and in-by land that lies within the less favoured areas.

1. ALL STOCKPROOF WALLS STILL IN AGRICULTURAL USE SHOULD BE RETAINED AND MAINTAINED IN THAT CONDITION USING WHEREVER POSSIBLE TRADITIONAL METHODS AND MATERIALS.

- * Maintenance of stockproof walls will involve the timely restoration of wear and tear by, for example, the replacement of coping stones which may have fallen off and the repair of accidental damage to a section of walling. Traditional materials should be readily available on site. The addition or replacement of top netting or one or two strands of wire fencing should be carried out as appropriate.
- * Care should be taken not to cause damage to other traditional walls.

2. ALL STOCKPROOF HEDGES STILL IN AGRICULTURAL USE SHOULD BE MAINTAINED IN THAT CONDITION.

- * Hedges are a valuable landscape feature, providing shelter for stock and food and nesting cover for wildlife.
- * Hedge trimming should not be too frequent or drastic as this will reduce vigour. They should either be trimmed in early spring prior to nesting or, preferably, very late in the autumn. They should be trimmed in rotation, leaving a proportion of hedge on each farm uncut throughout the winter in order to provide a food source for wildlife. Care should be taken when trimming to allow young hedgerow trees to flourish.
- * When hedges are laid it is advisable to protect them by back-fencing to prevent stock grazing new growth.

3. MAINTAIN ANY TRADITIONAL WEATHERPROOF FARM BUILDINGS FOR WHICH YOU ARE RESPONSIBLE IN A WEATHERPROOF CONDITION USING WHEREVER POSSIBLE TRADITIONAL MATERIALS.

- * In some upland areas the traditional nature of farm buildings can add greatly to the unique landscape character of that area. It is important, therefore, that they are maintained in a weather-proof condition and not allowed to deteriorate. Materials used for repairs should be in keeping with the original structure in order to maintain its characteristic appearance.
- * Grants may be available from Agriculture Departments or elsewhere for renovation of dilapidated buildings.

4. DO NOT DAMAGE OR DESTROY ANY FEATURES OF HISTORIC OR ARCHAEOLOGICAL INTEREST OR THOSE DESIGNATED AS SITES OF SPECIAL SCIENTIFIC INTEREST.

- * The land should be farmed in such a way that scheduled ancient monuments and other features of known historic interest are not damaged.

- * If a planned farming operation is likely to affect an historic feature or an SSSI advice should be sought from the County Archaeologist or appropriate conservation organisation.
- 5. WATER FEATURES SUCH AS LAKES, LOCHS, PONDS, STREAMS AND OTHER WATERCOURSES SHOULD BE MAINTAINED AS FAR AS PRACTICABLE AND IF POSSIBLE WITHOUT RECOURSE TO CHEMICAL MEANS.
- 6. WOODLAND, FIELD AND HEDGEROW TREES SHOULD WHEREVER PRACTICABLE BE MANAGED IN SUCH A WAY THAT THEY ARE ALLOWED TO REGENERATE FOR FUTURE FARMING NEEDS.
- * Woodland, copses and trees often form a significant part of the landscape. They have wildlife value and provide valuable shelter for livestock.
- * Management may involve the removal of diseased, dying or dead trees, thinning and coppicing and the exclusion of livestock.
- * Felling and replanting for timber is acceptable under an approved woodland management programme but trees should not otherwise be damaged or destroyed.
- * Grants may be available from Agriculture Departments or elsewhere.

MOORLAND : Points 7 to 14 of the Code apply to all moorland.

- 7. MAINTAIN MOORLAND AND DO NOT PLOUGH, LEVEL, RE-SEED OR OTHERWISE CULTIVATE.
- 8. DO NOT USE ORGANIC OR INORGANIC FERTILISERS OR LIME OR SLAG OR OTHER MATERIAL DESIGNED TO IMPROVE SOIL FERTILITY OR REDUCE ACIDITY.
- * The use of substances to improve soil fertility will result in the decline of plant and animal species associated with moorland habitat.

9. DO NOT APPLY PESTICIDES (FUNGICIDES AND INSECTICIDES).

- * Insects form a vital part of the diet for many moorland birds and the use of pesticides on moorland would break this food chain causing a reduction in moorland bird populations.

10. DO NOT APPLY HERBICIDES EXCEPT TO CONTROL BRACKEN, SPEAR THISTLE, CREEPING OR FIELD THISTLE, CURLED DOCK, BROADLEAVED DOCK OR RAGWORT. WITH THE EXCEPTION OF BRACKEN TREATMENT, HERBICIDE APPLICATION SHOULD BE BY SPOT TREATMENT OR WEED-WIPER ONLY.

- * Herbicides should not be used to control any weeds except those named above. To avoid unnecessary damage they should be applied by spot treatment or weed wiper. Traditional methods of mechanical weed control should be used wherever practicable.
- * The exception to the above is the control of bracken. ASULAM is the only herbicide that should be used and it should be applied by boom-mounted sprayers. When applied by aerial spraying care should be taken to avoid spray drift onto fern communities that are often found along water courses and cliff-faces.

11. WHERE IT IS YOUR RESPONSIBILITY HEATHER, GRASS AND SCRUB SHOULD BE BURNT OR CUT ON A REGULAR ROTATIONAL BASIS. WHERE BURNING TAKES PLACE IT SHOULD BE IN ACCORDANCE WITH THE RELEVANT HEATHER AND GRASS BURNING CODE.

- * Periodic burning or cutting of heather and grass will help spread grazing across the moor and provide better food value and more sustainable habitat for game and wildlife.
- * Scrub should be controlled by cutting, not burning.

12. NEW DRAINAGE SYSTEMS SHOULD NOT BE INSTALLED. EXISTING SYSTEMS MAY BE MAINTAINED BUT SHOULD NOT BE SUBSTANTIALLY MODIFIED.

13. WHERE PRACTICABLE AREAS USED FOR SUPPLEMENTARY FEEDING OF STOCK SHOULD BE CHANGED REGULARLY SO THAT VEGETATION IS NOT DAMAGED BY LOCALISED OVERGRAZING, TRAMPLING OR POACHING.

- * Supplementary feeding in winter can alter the composition of moorland vegetation by localised nutrient enrichment caused by dunging and the introduction of seeds in the feed. Concentration of stock can cause damage to vegetation by overgrazing, trampling and poaching.
- * Feed areas should whenever possible be located on mat grass, bracken or young vigorous heather.

14. AVOID FENCING ON MOORLAND.

- * New fencing should not be erected on moorland as this detracts from its open character.
- * Fencing on moorland should only be carried out as part of a stock management programme or vegetation restoration scheme. It should, therefore, be of a temporary nature and wherever possible follow natural landform and drainage patterns so as to limit visual intrusion.